



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/566,053

08/28/2006

Peter Geskes

1006/0148PUS1

7572

60601 7590 04/04/2011
Muncy, Geissler, Olds & Lowe, PLLC
4000 Legato Road
Suite 310
FAIRFAX, VA 22033

EXAMINER

FLANIGAN, ALLEN J

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

04/04/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,053	Applicant(s) GESKES ET AL.	
	Examiner Allen J. Flanigan	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 is/are allowed.
- 6) ☒ Claim(s) 1, 5-21 and 23-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| | 6) <input type="checkbox"/> Other: _____ |

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “profile free bending portion” of claim 22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Formal drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings provided by the applicant are of such poor

Art Unit: 3744

quality that they fail to clearly show various claimed features (i.e. the "regions of curvature" 16 of claim 1, the "flat region on the outside of a wave back" of claim 5, etc.).

Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 24 has been amended to recite "a main direction of extent", but it is not clear which direction is being referred to, and whether or not it is the same direction as the "length direction" recited in claim 1.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 10-12, 17-21, 23, 26, and 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, and US patent #6,823,934 to Andersson (hereinafter "Anderson '934").

As noted previously, Karlsson et al. show a corrugated pattern plate for stacked plate heat exchangers with "arrow ridges 9" in the illustrative embodiment that comprise a pair of straight leg portions joined by a single curved "elbow" or radius portion. It is known in the art that such corrugated plates can be provided with corrugations made up of varying numbers of such leg portions and bends or elbows; Jenssen shows an embodiment (Fig. 3) with three legs joined by two bends; Dahlgren shows an embodiment (Figs. 2-4) with four leg portions joined by three bends. As noted in the previous Office action,

Art Unit: 3744

Anderson '934 (who shows similar herringbone corrugations aligned along axes transverse to the elongate dimension of the plate, Figs. 6 and 7) states that “The relative distance, extension, profile, location and orientation of the corrugations 30 is largely determined by the fluid flows for which the heat exchanger is intended” (lines 23-25 of column 7). Thus, it would have been obvious to one of ordinary skill in the art to provide the herringbone pattern of Karlsson et al. with any desired number, orientation, extent, profile, and distance of straight corrugations joined by angled portions/bends at their ends, depending on the application of the heat exchanger.

Karlsson et al. in view of Jenssen, Dahlgren, and Anderson '934

Claims 5 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, and Anderson '934 as applied to claim 1 above, and further in view of Skoog '674 and Andersson '324.

It is known in the art of corrugated stamped plate heat exchangers to flatten the crests/troughs of the corrugations as shown in Skoog '674 and Andersson '324. Such a profile will inherently increase the surface to surface contact occurring where protruding ridges or crests of adjacent plates overlap; it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to provide such flattened crests in the heat exchanger of Karlsson et al. as modified above if a stronger plate to plate bond were desired.

Art Unit: 3744

Claims 6-9, 14, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, Anderson '934, Skoog '674 and Andersson '324 as applied to claim 5 above, further in view of Kivikas et al.

As noted previously and repeated in the above rejection of claim 1, Andersson '934 teaches that the specific dimensions of corrugated ridged profiles provided in such plate heat exchangers are recognized in the art to be result effective variables (see lines 16-28 of column 7 of Andersson '934). The discussion of “relative distance” and “profile” is considered to implicitly allude to the depth of the grooves in profile; Kivikas et al. further specifically acknowledge the result-effective nature of varying the groove depth and angle in such corrugated plates (bridging paragraph of columns 2-3 of Kivikas et al.). Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to vary or optimize the relative parameters of the groove pattern of Karlsson et al. depending on the intended fluids, flow speeds, and desired performance parameters of a given application. See MPEP 2144.05 II, “**OPTIMIZATION OF RANGES**”. Regarding claim 27, selecting some of these parameters (such as groove/ridge width or spacing and angle) will inherently determine the density or concentration of contact points between adjacent plates in the stack.

Regarding claim 14, see the bridging paragraph of columns 5-6 of Andersson '934. It would have been obvious to one of ordinary skill in the art

Art Unit: 3744

at the time the instant invention was made to form the ports of Karlsson et al. in a noncircular shape depending on the types of fluid meant to be used in the exchanger as suggested in Andersson '934.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, and Anderson '934 As applied to claim 12 above, further in view of WO 85/02670 to Bergqvist et al.

It is known in such plate heat exchanger designs as shown by Bergqvist et al. to provide additional inclined corrugations with ridges that are at a different (steeper) angle compared to the main body in the end regions to act as distribution fields for the fluid flowing between the plates, and it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to adopt such differently angled corrugations in the regions adjacent the corners or ends of the plates of Karlsson et al. to help uniformly distribute the fluid across the interplate flow field.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, and Anderson '934 as applied to claim 1 above, further in view of Skoog '778.

It is known in the art as shown by Skoog '778 to alternate plates that have different ridge angles so as to "obtain passages of different thermal lengths", to accommodate different fluids flowing within the passages of the plate stack. Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to do the same in Karlsson et al.,

Art Unit: 3744

forming every other plate with ridges at an angle differing from those in the adjacent plate as taught in Skoog '778.

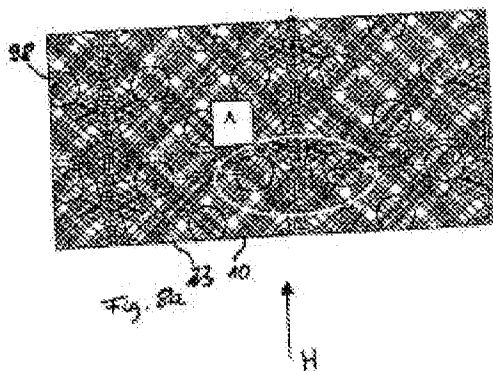
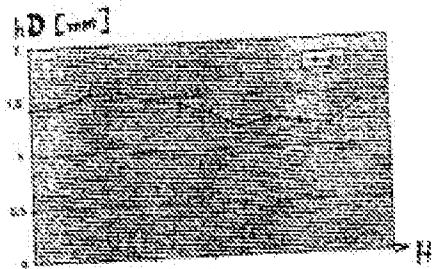
Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karlsson et al. in view of Jenssen, Dahlgren, and Anderson '934 as applied to claim 1 above, further in view of Mosher and Munoz.

Hydraulic diameter is a parameter of fundamental concern for designers of heat exchangers. One skilled in the art recognizes that individual passage hydraulic diameter will profoundly affect factors such as the pressure drop of the device. See Mosher, bridging paragraph of columns 2-3 indicating that D_h is an important factor dictating plate design in such stacked plate heat exchangers. Munoz teach that a hydraulic diameter range of 1-3 mm is preferred, for example, for using stacked corrugated plate heat exchangers for cooling oil. Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to select any desired hydraulic diameter for the passages of Karlsson et al. depending on the desired application.

Applicant's arguments with respect to the above-rejected claims have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 3744

Regarding the drawing objection, contrary to applicants' comments, there is no gap 37 illustrated in Figs. 8 and 9:



Claim 22 is allowable over the prior art of record.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply

Art Unit: 3744

is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen J. Flanigan whose telephone number is (571) 272-4910. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen J. Flanigan/
Primary Examiner, Art Unit 3744